Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Original) A device, comprising:

an optical resonator designed to support whispering gallery modes and formed of a dielectric material that has an energy level structure that absorbs light at a selected optical frequency and absorbs electrical energy at an electrical frequency, wherein absorption of said electrical energy changes absorption of said light;

an optical coupler positioned adjacent to said optical resonator to evanescently couple optical energy into said optical resonator in a whispering gallery mode or out of said optical resonator; and

an electrical coupler positioned to couple an electrical signal at said electrical frequency into said optical resonator to at least partially overlap with said whispering gallery mode to modulate optical energy in said optical resonator by modulating said absorption.

2. (Original) The device as in claim 1, wherein said energy structure includes first, second, and third different energy levels to allow for (1) at least one optical transition between the first and said second energy levels at said selected optical frequency and (2) an electronic transition between said second and said third energy levels in resonance with said electrical frequency.

3. (Original) The device as in claim 2, wherein a relaxation between said second and said third energy levels is

substantially less than a rate of optical absorption in said one optical transition.

4. (Original) The device as in claim 2, wherein said first energy level is an excited state and said second and said third energy levels are ground states.

5. (Original) The device as in claim 4, wherein said second and said third energy levels are two different hyperfine energy splitting levels of a common energy level.

6. (Original) The device as in claim 5, further comprising a tuning mechanism to adjust an energy difference between said second and said third energy levels.

7. (Original) The device as in claim 6, wherein said tuning mechanism includes a mechanism operable to produce a tunable magnetic field at said optical resonator.

8. (Original) The device as in claim 1, wherein said dielectric material is doped with transition ions.

9. (Original) The device as in claim 8, wherein said transition ions include chromium.

10. (Original) The device as in claim 8, wherein said transition ions includes iron.

11. (Original) The device as in claim 8, wherein said transition ions include manganese.

12. (Original) The device as in claim 8, wherein said dielectric material includes a crystal.

13. (Original) The device as in claim 8, wherein said dielectric material includes a glass.

14. (Original) The device as in claim 8, wherein said dielectric material is further doped with ions that affect a net magnetic field at each transition ion.

15. (Original) The device as in claim 1, wherein said dielectric material includes a ruby doped with transition ions.

16. (Original) The device as in claim 15, wherein said transition ions include chromium.

17. (Original) The device as in claim 1, wherein said dielectric material exhibits an electro-optic effect to change a refractive index in response to an electric field.

18. (Original) The device as in claim 1, wherein said optical resonator include a spherical portion of a sphere.

19. (Original) The device as in claim 18, wherein said spherical portion includes an equator of said sphere.

20. (Original) The device as in claim 18, wherein said optical resonator has a disk shape.

21. (Original) The device as in claim 18, wherein said optical resonator has a ring shape.

22. (Original) The device as in claim 1, wherein said optical resonator is a sphere.

23. (Original) The device as in claim 1, wherein said optical resonator has a non-spherical shape.

24. (Original) The device as in claim 1, wherein said optical coupler includes a prism.

25. (Original) The device as in claim 1, wherein said optical coupler includes an angle-polished waveguide.

26. (Original) The device as in claim 25, wherein said waveguide is a fiber.

27. (Original) The device as in claim 25, wherein said waveguide is a planar waveguide formed on a substrate.

28. (Original) The device as in claim 1, wherein said optical coupler includes an input coupler and an output coupler.

29. (Original) The device as in claim 1, wherein said optical coupler is operable to produce an optical output from said optical resonator.

30. (Original) The device as in claim 29, further comprising an optical detector coupled to convert said optical output into an electronic signal.

31. (Original) The device as in claim 29, further comprising an optical device coupled to receive said optical output.

32. (Original) The device as in claim 29, wherein said optical device includes a fiber.

33. (Original) The device as in claim 1, wherein said electrical coupler includes an electrical wave cavity that at least partially encloses said optical resonator.

34. (Original) The device as in claim 1, wherein said electrical coupler includes electrodes.

35. (Original) The device as in claim 1, further comprising a signal generator operable to generate said electrical signal.

36. (**Currently Amended**) The device as in claim 1, further comprising an antenna <u>**coupled to said electrical coupler and**</u> operable to convert an electromagnetic wave into said electrical signal <u>**received by said electrical coupler**</u>.

37. (Original) The device as in claim 1, further comprising a light source operable to produce said light.

38. (**Currently Amended**) A wireless communication system, comprising a plurality <u>**of**</u> wireless transceivers, at least one transceiver including:

an antenna to receive an electromagnetic wave signal at an electrical frequency;

a light source to produce light at a selected optical frequency;

an optical resonator designed to support whispering gallery modes and formed of a dielectric material that has an energy level structure that absorbs light at said selected

optical frequency and absorbs electrical energy at said electrical frequency, wherein absorption of said electrical energy changes absorption of said light;

an optical coupler positioned adjacent to said optical resonator to evanescently couple optical energy into said optical resonator in a whispering gallery mode or out of said optical resonator; and

an electrical coupler coupled to receive said electromagnetic wave signal from said antenna and positioned to couple said electromagnetic wave signal into said optical resonator to at least partially overlap with said whispering gallery mode to modulate optical energy in said optical resonator by modulating said absorption.

39. (Original) The system as in claim 38, further comprising a satellite on which said one transceiver is located.

40. (Original) The system as in claim 38, wherein said one transceiver is a base station.

41. (Original) The system as in claim 38, wherein said one transceiver is a moving unit.

42. (Original) A communication system, comprising:

an electronic communication system operable to transfer information on electrical signals;

an optical communication system operable to transfer information on optical signals; and

an interface between said electronic communication system and said optical communication system, said interface comprising:

a light source to produce light at a selected optical frequency,

an optical resonator designed to support whispering gallery modes and formed of a dielectric material that has an energy level structure that absorbs light at said selected optical frequency and absorbs electrical energy at an electrical frequency supported by said electronic communication system, wherein absorption of said electrical energy changes absorption of said light,

an optical coupler positioned adjacent to said optical resonator to evanescently couple optical energy into said optical resonator in a whispering gallery mode or out of said optical resonator, and

an electrical coupler coupled to receive an electrical signal from said electronic communication system and positioned to couple said electrical signal into said optical resonator to at least partially overlap with said whispering gallery mode to modulate optical energy in said optical resonator by modulating said absorption,

wherein said optical coupler further couples modulated optical energy out of said optical resonator into said optical communication system.

43. (Original) The system as in claim 42, wherein said optical communication system includes a free space system.

44. (Original) The system as in claim 42, wherein said optical communication system includes a fiber system.

45. (**Currently Amended**) The system as in claim 42, wherein said electronic communication system **includes** ~~include~~ a wireless system.

46. (Original) The system as in claim 42, wherein said electronic communication system includes a wired system.

47. **(New)** A system, comprising a device which comprises:

an optical resonator designed to support whispering gallery modes and formed of a dielectric material that has an energy level structure which comprises first, second, and third different energy levels to allow for (1) at least one optical transition between the first and said second energy levels at a selected optical frequency, (2) an electronic transition between said second and said third energy levels in resonance with a different frequency, and (3) absorption at said electronic transition changes absorption at said optical transition;

an optical coupler positioned adjacent to said optical resonator to evanescently couple light in resonance with said optical transition into said optical resonator in a whispering gallery mode or out of said optical resonator; and

an electrical coupler positioned to couple an electrical signal in resonance with said electronic transition into said optical resonator to at least partially overlap with said whispering gallery mode to modulate optical energy in said optical resonator by modulating absorption of said electrical signal at said electronic transition.

48. **(New)** The system as in claim 47, further comprising an antenna to receive a radiation wave that comprises said electrical signal in resonance with said electronic transition and connected to said electrical coupler to couple said electrical signal to said electrical coupler.

49. **(New)** The system as in claim 47, wherein a relaxation between said second and said third energy levels is substantially less than a rate of optical absorption in said one optical transition.

50. **(New)** The system as in claim 47, wherein said first energy level is an excited state and said second and said third energy levels are ground states.

51. **(New)** The system as in claim 50, wherein said second and said third energy levels are two different hyperfine energy splitting levels of a common energy level.

52. **(New)**The system as in claim 51, further comprising a tuning mechanism to adjust an energy difference between said second and said third energy levels.

53. **(New)** The system as in claim 52, wherein said tuning mechanism comprises a mechanism operable to produce a tunable magnetic field at said optical resonator.

54. **(New)** The system as in claim 47, wherein said dielectric material exhibits an electro-optic effect to change a refractive index in response to an electric field.